

GUARDRAIL POLICY FOR HAMILTON COUNTY ROADS

MAJOR IMPROVEMENT PROJECTS

The intent of this portion of the policy is to provide general criteria for the installation of guardrail to be included in a major roadway or bridge improvement project along the County road system. The criteria listed below should be considered to be the minimum requirements for major improvement projects. These projects include the widening of roadways, the construction and/or the major rehabilitation of bridges, the creation of flatter side slopes, the installation of major culverts and other major projects that require the acquisition of large amounts of additional right-of-way. These criteria should meet all requirements of Section 5591.36 of the Ohio Revised Code (ORC).

Guardrail should be provided only at those locations where a roadside hazard cannot be economically eliminated, relocated or reduced in severity. Guardrail should not be installed to protect private or public property such as fencing, shrubbery, trees or grassed areas. Since guardrail in and of itself could present a roadside obstacle and could be more perilous to an errant vehicle than the hazard it is intended to shield, the use of guardrail must be clearly justified and warranted. Guardrail must not be used where the justification criterion is marginal. Sound engineering judgment must be used in evaluating all potential guardrail sites and should include the consideration of local conditions, the type of roadside hazard, the accident history, the average daily traffic volumes (ADT) and the prevailing speed of traffic.

The installation of guardrail is to be in conformance with Section 600 of the Ohio Department of Transportation's (ODOT) Location and Design Manual (L&D) and is normally warranted under the following conditions:

- A) Along slopes steeper than 3:1

NOTE: Guardrail should not be used on slopes flatter than 3:1; on slopes between 3:1 and 2.5:1 less than eight (8) feet in height or on slopes of 2:1 less than six (6) foot in height. The height is to be measured from the edge of the shoulder to the bottom of the slope.

- B) At non-transversible natural features that represent a continuous peril rather than an isolated fixed object. These would include, but not be limited to, rock slopes or outcroppings; lakes, streams or creeks with normal water depth greater than two (2) feet; shoulder drop-offs with slopes equal to or greater than 1:1 and a height of two (2) feet as measured from the edge of the shoulder to the bottom of the slope. Wherever possible, the non-transversible feature should be eliminated in a major improvement project.
- C) At fixed objects. These would include, but not be limited to, overhead sign supports, bridge approaches to bridges and bridge parapets, bridge piers, and large culverts.

In the process of evaluating and determining potential locations for the installation of guardrail and the type of guardrail to be installed, the protection of the "Clear Zone" as defined in Section 600 of the latest edition of the L&D must be considered. The installation of guardrail to shield fixed objects is also generally not practical or beneficial for urban roads with low design speeds of 40 MPH or less.

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In all cases, the preferred alternative to installation of guardrail is to keep the recovery area or clear zone free of fixed objects wherever economically feasible. If it is not practical or possible to remove or relocate an object within the clear zone, then a guardrail may be necessary. Guardrail should be installed only if it is clear that the guardrail offers the lesser hazard potential. Alternatives other than guardrail should always be considered. For example, in areas that the slopes would not normally require protection but the slopes are steeper than 3:1 due to culvert outlets, the culverts should be extended, if possible, to lessen the slope and avoid the need for guardrail installation.

The evaluation of proposed locations for the installation of guardrail to be included in major roadway or bridge projects will be the responsibility of the Planning and Design Department and the Construction/Bridge Department.

RESURFACING, RESTORATION, REHABILITATION (3R) AND MAINTENANCE PROJECTS

The intent of this portion of the policy is to provide general criteria for installing guardrail within the current right-of-way limits of the County road system under a resurfacing, restoration and rehabilitation (3R) or maintenance project. 3R or maintenance projects do not usually include the widening of the roadway, the creation of flatter side slopes or the acquisition of additional right-of-way/easements. The criteria listed below should be considered to be the minimum requirements for these projects. These criteria should meet all requirements of Section 5591.36 of the Ohio Revised Code (ORC).

Guardrail should be provided only at those locations where a roadside hazard cannot be economically eliminated, relocated or reduced in severity. Guardrail should not be installed to protect private or public property such as fencing, shrubbery, trees or grassed areas. Since guardrail in and of itself could present a roadside obstacle and could be more perilous to an errant vehicle than the hazard it is intended to shield; the use of guardrail must be clearly justified and warranted. Guardrail must not be used where the justification criterion is marginal. Sound judgment must be used in evaluating all potential guardrail sites and should include the consideration of local conditions, the type of roadside hazard, the accident history, the average daily traffic volumes (ADT) and the prevailing speed of traffic.

The installation of guardrail is normally warranted under the following conditions:

- A) Along slopes steeper than 3:1

NOTE: Guardrail should not be used on slopes flatter than 3:1; on slopes between 3:1 and 2.5:1 less than eight (8) feet in height or on slopes of 2:1 less than six (6) foot in height. The height is to be measured from the edge of the shoulder to the bottom of the slope.

- B) At non-transversable natural features that represent a continuous peril rather than an isolated fixed object. These would include, but not be limited to, rock slopes or outcroppings; lakes, streams or creeks with normal water depth greater than two (2) feet; shoulder drop-offs with slopes equal to or greater than 1:1 and a height of two (2) feet as measured from the edge of the shoulder to the bottom of the slope.
- C) At fixed objects. These would include, but not be limited to, overhead sign supports, approaches to bridges and bridge parapets, bridge piers, and large culverts.
- D) At high accident locations involving some roadside hazard with said accidents resulting in injury or damage to property or vehicles. Requests for guardrail at these locations may be generated by citizen complaint or by review of accident records.

NOTE: Prior to the installation of guardrail, these requests are to be reviewed by the Hamilton County Engineer's Planning and Design Department and the Traffic Department. These Departments will determine whether site improvements, in lieu of the installation of guardrail, are possible and warranted so as to eliminate the need for guardrail and satisfactorily reduce any future accident potential.

In the process of evaluating and determining potential locations for the installation of guardrail and the type of guardrail to be installed, the protection of the "Clear Zone" as defined by the Ohio Department of Transportation's (ODOT) Location and Design Manual (L&D) must be considered. In the latest edition of the L&D, Section 600 provides information concerning the clear zone and the definition is modified by Section 906 of the L&D for Non-Freeway Resurfacing, Restoration and Rehabilitation (3R) Improvements.

In all cases, the preferred alternative to installation of guardrail is to remove the object/hazard and keep the recovery area or clear zone free of fixed objects wherever economically feasible. If it is not practical or possible to remove or relocate an object within the clear zone, then a guardrail may be necessary. Guardrail should be installed only if it is clear that the guardrail offers the lesser hazard potential. Alternatives other than the installation of guardrail should always be considered. For example, in areas where the slopes would not normally require protection but have been made steeper than 3:1 due to the location of culvert outlets, the culverts should be extended, if possible, to lessen the slope and avoid the need for guardrail installation.

It is recognized that 3R type projects do not usually include funds for mass relocation of hydrants, poles, light standards or other objects and do not usually require the acquisition of additional right-of-way. It is also recognized that several other factors must also be considered in evaluating the installation of guardrail within existing right-of-ways. These include the possibility that the potential impact of the existing hazard(s) may be minimized by driver familiarity, the implementation of controlled speed zones, and/or the installation of lighting or other traffic control devices. Many roads also have existing curbs and narrow shoulders that would require any guardrail to be installed flush with the back of curb. The shoulder then is not usable for recovery and the probability of vehicles striking the guardrail at the back of curb becomes significantly greater. The installation of guardrail to shield fixed objects is also generally not practical or beneficial for urban roads with low design speeds of 40 MPH or less.

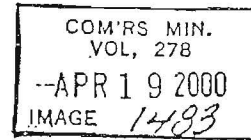
On 3R or guardrail upgrading projects, existing Type 4 and Type 5 guardrail shall be raised to standard height if the top of the rail is more than three (3) inches below or above the normal guardrail height, usually twenty-seven (27) inches. When Type 4 guardrail is upgraded to Type 5 guardrail, it will normally be acceptable to decrease the horizontal clear shoulder by the eight (8) inch width of the block-out if it is possible to salvage the existing posts in place. If the height of the existing Type 4 guardrail is too low or the ADT is greater than 2000, the project should require the removal of the existing guardrail and the installation of a new Type 5 guardrail. The Type 5 guardrail shall be installed without blocks along roads with a design speed of 40 MPH or less.

The evaluation and determination of proposed locations for guardrail installations will be a responsibility of the Maintenance Supervisor. The Maintenance Supervisor shall forward his recommendations to the Planning and Design Department and the Construction/Bridge Department.

After the location(s) for guardrail installations have been reviewed and approved, the installation of the guardrail will be accomplished by one of the following means:

- 1) By including the installation of the guardrail in the annual countywide guardrail Project.
- 2) By issuing work orders to the Maintenance Department for the installation of the guardrail.

GENERAL



There are two (2) types of guardrail currently accepted:

- A) Type 5 guardrail (block-out, W-beam, strong post) shall normally be used on County projects along roads with an ADT greater than 2,000 and shall be specified for runs of two hundred (200) feet or less approaching bridge parapets or other fixed objects. The Type 5 guardrail shall be installed without blocks along roads with a design speed of 40 MPH or less.
- B) Type 4 guardrail (W-beam, strong post) may be used on projects along roads with ADT less than 2,000.

When the topography and the distance from the edge of pavement or curb to the obstacle permit, the face of the guardrail shall be offset a minimum of three (3) feet from the edge of pavement or the face of the curb. At some locations, it may be necessary to utilize special precautions such as nine (9) foot long posts to achieve the minimum setback or, if said setback can not be practically achieved, to install the guardrail at the maximum setback available.

Gaps of one hundred and fifty (150) feet or less between adjacent sections of guardrail shall be eliminated, unless the gap is needed for maintenance purposes or other access requirements. Wherever feasible and practical, the terminus of each guardrail section shall be installed with a buffered end section flared as per current ODOT standards.

The amount of guardrail required in advance of a hazard or obstruction will depend upon the posted speed limit for the road, the distance from the edge of the pavement to the front of the object being shielded and the offset distance from the edge of the pavement to the end of the effective guardrail. The length of needed guardrail does not include the end treatment at each terminus.